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Instances, Hints, and Applications, relating to a main point, solicited in the Preface to this 4th Vol; concerning the use may be made of Vaults, deep Wells, and Cold Conservatories, to find out the Cause, or to promote the Generation of Salt, Minerals, Metals, Christal; Gems, Stones of divers kinds; and helps to conserve long; or to hasten Putrefaction, Fertility of any Land, &c. by the same D. Beale, in another Letter to the Publisher.

Sir,

I Shall here collect from your own Tracts, (with a brief touch from my own Observations and Readings) a few Hints, pertaining to your Solicitations in your *Preface to this 4th Vol. N. 45. pag. 896.*

1. Our worthy Friend, Mr *Evelyn*, in his *Sylva*, as it is now most excellently improved in his 2^d Edition, C. 3. p. 26, reciteth, that a certain Oak was found buried somewhere in *Transylvania*, near the Salt-pits, intirely converted into an hard Salt. He adds, that this Experiment, if true, may possibly encourage some other attempts for the multiplying of Salt. *Thus be.* And hence I hope, I may be excused for my Inquisitiveness after Salt-springs; which however weak, may possibly sometimes Indicate more Fossile Salt than is drained or approached by that particular Spring. And Sr. *Hugh Plat* in the best Cabinet of his *Jewel house* c. 104. rebukes our lazy English for neglecting the rich and fertilizing Quality of our Brine, which encompassth our Hand, and meets us at the foot of some of our Hills. Some indeed in the *West* do make use of brackish sand, and do find a good reward when they bear the charges of carrying it far, for the enriching of their Inheritances; whilst other Rusticks will not be intreated to accept of the Brine they have in the midst of their own Grounds. Certainly the Saline steams are carryed by the Air and Wind much farther from Salt itself in heaps, or vessels, than from the Sea water: From whence the Dews, which arise in vapours, do descend as sweet and pure as the Dew which ascends from the Earth; and the Rain shews no difference. And I gave you

once

once an Experimental proof, that either the Saline steams; which ascend from a heap of Salt, do pierce through very thick stone-walls; Or (which I did much rather conceive,) they generate more Salt, to a great depth of thickness, in the Lime and Mortar of the Walls.

2 Dr *Power* in his *Microsc. Obs.* pag. 62. assures from good Testimony, and common experience, that a Mineral heat in the Subterraneous parts produceth Minerals: And particularly, that in Allum and Coperas-mines, those Minerals being broken, exposed, and moistened, will gather an actual heat; and produce much more of these Minerals, than else the Mine would yield. And there he further proves by an unlucky accident, that Brasse-lumps, (which he saith is a kind of Marcasite,) being layd in heaps and exposed to the moist Air, or sprinkled with water, will smoak, and grow exceeding hot; and sometimes take fire, and burn all that is about them. *Thus he.* And all sorts of Dung afford a Heate, some less, and some stronger; some speedily, and some more permanently. And store of Nitre may be had from the sweepings of the house, any kind of ashes, shovelings of any sordid place, the cleanings from the back stays, and emptying of the Chamber-pots, if always cast as *stratum superstratum* in a dry Well, or Vault, only so covered and fenced, that the Rain and water gets not in. Dr *Power* shews here, How Metals or Minerals may be generated; but how far this Generative force will run, and from what Bulke of Materials; and what Materials are aptest to be transformed into what Minerals or Meta's, we must refer to further tryal. Of this we are certain, that by a strong Fire, thus raised by Brasse-lumps, Stones and Metals may be vitrified, and thence assume another Nature, and Lustre than is ordinary; And by the Gentler heats, (besides the acqurest of Salt-peter in the end) there may be Mechanical applications peculiar for the Gradual and slow productions of Chymistry, both for natural effects upon usual Proximities, and for Artificial Contrivances.

3. In your *Num. 6.* p. 101. you shew us, that there is a place in *England*, where, without petrifying water, wood is turned into stone, in a Sandy Earth. But can we yet say, whether Vaults digged in such Grounds may not have a Petrifying Spirit, as there

there is a faint and flow Petrifying Spirit in *Oakey Rock* near *Wells*, and, as I hear, in some other Rocky Vaults in *England*, and else-where? Or do we yet know, what will more easily and speedily, and what more difficultly, be turned into a Stone? Or what the differing effects may be from the several kinds of Materials? Whether Bones, or Horns, or *Album Gracum*, &c. may not here be turned into *Ostea-Colla*, or to a better Improvement? And they, that have the command of Petrifying waters, may make such and many other tryals for considerable Discoveries in Philosophy. I know a Rock in *England*, which hath a Hole so deep, that the Neighbours do report and generally believe, that it is bottomless; And a stone may be heard to dash from side to side a pretty long time. Some Philosophical uses may be made of such deep holes. And the ground, which bears the fair stones, called *Astroites*, about *Belvoir-Castle* in *Lincoln-shire*, and that which bears the little Diamonds near *Bristol*, and where the stones of peculiar figures, as of *Helmets*, *Scalops*, *Cockles*, &c. are found frequent on the surface, digg'd up in heaps, in such places the ground may be tryed, both rayed in Hillocks and sunk into Vaults.

4. I have by experience found, that there are some Vaults of no great depth, not at most above 4 or 5 feet, that will speedily dissolve stones, and release from the stony Ligature. Of this I reserve for you a further accompt; For I am already tedious, and this would involve into many Circumstances hardly Credible; whereof one is this, that being exposed to some assaults from the keenest Northwinds, it never yielded to the freezing of any thing placed there in the hardest Frosts of this year, or of the years 1663 and 1665: as if the Petrifying Spirit had some affinity with a long lasting Infrigidation, since that which unfoldeth the Petrifying Ligature, by the same property resisteth Frost also. So one would imagine: But by common Experience we know, that Frosts with Snow and Rain will dissolve many kinds of stone, and a very rich Marle, which for one, two, and sometimes more winters holds out against all weather, and looks all over very like greety stone. Chalk is a pregnant Compost for some Lands; the Frost and Snow will dissolve it, and make it run into good manure, when the Summer-heat with all the Summer-rain cannot dissolve it.

5. You

5. You offer something that may pertain to this purpose in your *Tra&t* of N. 49. p. 982. concerning the Generation of Chrystal. And I think, I could shew, by a train or list of proofs, a strong probability, that, as Heat vitrifies, so Durable Frosts, with some Concomitants of like nature, by some alternative oppositions of Heate, or perhaps by coincidence of extreame, do Chrystallize, or more firmly Petrify the moisture or sweat of Rocks and Quarries. The petrifying spirit crispeth by an acuter angle into a firmer solidity, than can be performed by any Frosts to us known. And the Marcasite is formed by a constipation stronger than that which petrifyeth; and sometimes where Marcasites are generated, there are found also some parcels of very pure, firm, and ponderous Copper, which requir'd a stronger Compression, as by an acuter Angle, for the Generation of the Copper, then for the Generation of the Marcasite is necessary.

6. And that Frosts also alter the Nature of Liquors, we had now some experience in this snowy season: For we saw the water of dissolved Snow perform a quick cure, in taking out the fire, when the flesh was burnt by a warming pan of Brass; which Metal commonly makes the burning more difficult to be cured: Which did put me in mind, to examine the figures of the Snow, which now fell in this extreame Frost. I expected, that we might see through the small particles, at least as through Lice, Fleas, Cheese-mites, &c. by some kind of transparence; but I was deceived: My assistants could make nothing of it, either by an ordinary or extraordinary Microscope. I was invited to the Inquiry by your N. 39. p. 774. reporting, that in *Germany*. March 1666, or about that time, Snow fell there, having the shape of Pillars, some Tetragonal, and some Hexagonal, with a neat Basis, and a larger head, as in Columns. Perhaps a more skilful search by the best Microscopes may discover, either in what shape the Rorid particles are, when they are frozen into Snow, or into what figures or Angles the particles of the Snow are compressed by Frosts. If the Clouds were continued an intire body of water, they could not quite hinder the sight of the Sun and Stars; for a good depth of clear water will not hinder it: but the particles, being divided in the
Clouds

Clouds, it must needs hide the Sun from us, as such a depth of *foame* and Snow would do. But in this *Paragraph* I would hint the change, and beneficiall Improvement, that may be made upon some Liquors by meer Frosts, by Chrystallizing, and perhaps more by Petrifying Vaults.

7. I observ'd a Spring, that in all the extreame Frosts, that have been these ten years, hath yielded a small stream, which running over a large Tract of Pasture, keeps all the bankes and borders Green, and free from freezing, dissolving the Snow, and smoaking all the way where it runs. And this warming force it holds for 4 or 5 foot on each side, wherever it runs, till the very small stream falls into a little Chancel. Hence I would offer, that some better use may be made of such streams for Hortulan Entertainments, and for many Philosophical uses, if well considered. The Sober Water-drinkers, who are addicted to cleanliness, and a simple Diet, may by the smell and tast discover, and fore-warn of the great Diversities of waters; which are more or less Petrifying, and which more powerfully dissolving petrification; which assists Nutrition, and which is more Jejunne. Yea perhaps by Assiduity and Instructions they may Indicate by Springs, and the steams of Vaults, much of the Treasures of our Hills and Mountains; and of all the Subterraneous World. We trayn up Setting-Dogs to find Partridges, but we neglect the Ayd, that may be had from Inquisitive men for the finding out of Springs for Bolus's, Salts, Minerals, Stones, and Metals; For Health, Accommodations, Ornaments, and wealth. You see here, how by Vaults and deep Wells, furnished with proper Materials, and so covered, that by apertures wider, and smaller at pleasure, we may find the effects of Air in the entrance, and by the rebounding returns, and by mixtures with Subterraneous Steams many effects, which will hardly appear by any contrivance of the *Pneumatic* Engine: As to try, what the Mineral steams of all kinds will operate upon all sorts of Materials, when they are strained by the driving and rebounding Air through strait and winding Orifices of various shapes, wider and narrower? Whether the Barkes or Timber of Trees are more apt to receive the Saline or other steams? And whether the common Saline steams may not be appropriated to o-

ther vertues by the severall kinds of Barks &c? The *Tan ne* know, that the Bark of some Trees hath much more Salt than the Timber: And generally where the Barks have the stronger or finer relish or Vertue, the Wood hath very little. The wood of the *Cinamond*-tree is Insipid; And the wood of *Guaiaacum* hath not halfe that vertue which the Bark hath. But in these trials we should take heed of a danger from the compressed steams, And if we would use a deep and dry Well, for strong heate by Marcasites, or otherwise, we should remember Mr *Boyle's* proofs of the Incredible weight of the Air, and provide very strong Arches and thick Planks for the Coverture, before we adventure to stop in the Air, when it is highly rarified by such heates.

8. But that which chiefly encouraged me to give you these remarkes of the operations of Frosts and Cold, is this. It growes in fashion to make *Conservatories* for *Snow* and *Ice*; and Mr *Boyle* hath layd such deep Foundations to find out the Nature, propertyes, and effects of Cold and Frosts, that we may almost hope, that by this branch of Philosophy, when it shall be as carefully Cultivated, as Chymistry now is, we may perform as much, if not more and stranger things than are yet done by Fire. I do often ask Gardeners, and skilful Husbandmen, whether all sorts of Land are more fertiliz'd, or more speedily, by the solar Influence in our Climate, or by Frosts. For these two are the two busy hands, which manure all kinds of Earth and Water into grateful pregnancy, as *Virgil* of Old,

Illæ seges æquum votis respondet avari

Agricolæ, his quæ solem, his frigora sensit. 1 *Georg.* v. 47. And they generally affirm, that Frost and Snow make the quicker dispatch amongst us, and the more general and richer Fertility. And, that some Distillations may be made by Frosts, I have this proof: At my request you were pleas'd to get me a Thermometer of a very smal and slender Stem, especially the higher parts for 10 Inches near the head: All that see it, do wonder how such a slender Glass could be safely convey'd hither. The Spirit of wine is very deeply tinged, which renders it in that smalness clearly visible: I expos'd it out of Doors in the hardest Frosts of the extreame winter *Anno* 1665. when the winds

winds were also violently sharpe. In those Frosts there ascended into the top of the Glafs small drops like a Dew, which afterwards in time descended into the stem, and filled up the space of an Inch or thereabouts, and it was as clear, and bright, and more flickering, than any Chrystal, or Glafs. On the contrary, in the heat of the Summer I placed a stronger Thermometer of slow Motion on a Sunny wall, till a part of the Liquor ascended into the top, and there continued some hours: Then by sloping the Glafs I divided it from the rest at a little distance. And this took up two inches in the stem, being at first of a very pale reddishness. I guess it contained much of the Spirit of Vrine, which at first was intermingled with the Spirit of Wine; but in a short time all the reddishness was quite consumed: And since it remaines of a transparent, but very dull clearness, in no degree so bright, and flickering, as the other. If this proves a distillation of the same kind, and not differing from distillations by heate, then it may excuse my expression above, of the coincidence of extreames. If it proves a distillation of another kind, then there is a fresh task for Philosophers. However, whether one or the other be true, we are sure, that false grounds and vain hopes have done Infinite good to us and to our Posterity by *Pyrotechne*. And why may not we accept of specious hopes to attempt something in *Psychrotechne*? But I made another tryal with the stronger Thermometer: By which, and by other arguments, I am convinced, that manifold uses may be made of our Icy Conservatories for the Conservation of some Bodyes, and for strange alterations on others, as they are placed, higher or lower; nearer to or further from the Snow or Ice. Put this and other matters, and especially such as pertain to the quick and cheap fertilizing of any sorts of Land for Hortulan uses, I must reserve for another time: And then I shall not put you off with Projects; but give you the evidence of sure and safe Experience; and such as may be much more useful, than this or the former is either curious, or extravagant.